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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/683,727	10/10/2003	Arthur Sherman	ASMMC.9CP1DV1C1	1627

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EXAMINER	
STOUFFER, KELLY M	
ART UNIT	**PAPER NUMBER**
1792	

NOTIFICATION DATE	DELIVERY MODE
12/28/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/683,727	SHERMAN, ARTHUR	
	Examiner	Art Unit	
	Kelly Stouffer	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 18-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 18-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 26 November 2007 have been fully considered but they are not persuasive. The applicant argues that Penneck teaches treating aluminum with oxygen plasma that is not in the same reaction chamber as deposition as claim 1 requires. However, it is noted that the rejection is made over Dillon in view of Penneck. Dillon teaches that all processes occur in the same reaction chamber as discussed in previous office actions, Penneck is used merely to show the utility and obviousness of using another oxygen source to oxidize an aluminum layer such as that in Dillon. Further, Penneck does show a single reaction chamber in Figure 4 that is used to process the substrate. Because Penneck uses a moving substrate has no bearing on the rejection of Dillon in view of Penneck as it is the oxidation of the aluminum layer that is critical, and not the choice of support for the layer, which would be apparent to one of ordinary skill in the art. The applicant argues that there is no suggestion in Penneck that the use of atomic oxygen can be carried out cyclically. Again, the rejection is made over Dillon in view of Penneck. Dillon teaches cyclic deposition with aluminum and an oxygen source as discussed below and in the previous office action, Penneck only provides an alternate oxygen source. Further, the applicant argues that there is no indication that the use of atomic oxygen in Penneck would be useful in Dillon, and that Penneck coats cables while Dillon creates films for high dielectric insulators. However, Penneck teaches that by using oxygen plasma, or atomic oxygen, to form a coating of the aluminum oxide (column 11 lines 1-18) one my form a layer free of contaminants

that would normally occur during wet deposition processes (columns 7 and 8 lines 59-21). Certainly one of ordinary skill in the art would recognize the utility in Dillon of minimizing surface contamination in a dielectric insulator, especially since Dillon takes sensitive infrared spectroscopy measurements (see Figures) in which contaminants would shift vibrations and cause less accurate spectra. Further, though the art gives sufficient reason to combine the features of these two references, *KSR International Co. V. Teleflex Inc.*, 550 US--, 82 USPQ2d 1385(2007) precludes this requirement for making a *prima facie* case of obviousness. Substituting Penneck's atomic oxygen with Dillon's oxygen source to oxidize TMA would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Additionally, the applicant argues that Dillon does not teach more than one monolayer of aluminum oxide formed as required by claim 1. However, Dillon et al. discloses that the thickness of an aluminum oxide layer after each cycle depends upon the amount of amorphous aluminum oxide present and the reaction mechanism (see pages 239-241 et seq.) Therefore, the variable of aluminum oxide layer thickness is modified by routine experimentation and is not inventive. Though the applicant argues that the process of Dillon is self-limiting, Dillon discloses the same procedure as the applicant, so if it was truly self-limiting, the "more than one monolayer" limitation in claim 1 would be improper. Penneck further supports the utility of this with the same precursor, trimethyl aluminum, in column 14 lines 9-35. In addition, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to

create more than one monolayer per cycle, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

The applicant further argues that Dillon teaches away from depositing aluminum oxide at room temperature. Dillon et al. cites a temperature of 300 K (p 232), which may be considered room temperature at least as broadly as it is described in the claims. Though it may not be a preferred temperature in Dillon as the applicant asserts in the instant arguments, it does not negate the fact that Dillon discloses this feature. It is noted that Dillon et al. also modifies this variable (for example, to 500 K as the applicant pointed out in the instant arguments) throughout the document to achieve different results due to reaction thermodynamics and reaction kinetics. Therefore, it also would have been obvious to one of ordinary skill in the art at the time of the invention to modify Dillon et al. to include a reaction temperature at room temperature absent evidence showing a criticality for room temperature.

Therefore, for at least these reasons, the rejections of the previous office action are maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-4 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dillon et al. (Surface Science 322(1995) 230-242) in view of US Patent number 4985313 to Penneck et al.

Regarding claims 1 and 18, Dillon et al. (in the abstract, among several other places in the document) discloses a process for growing aluminum oxide on a substrate in a single reaction chamber by a sequential chemical vapor deposition or an ABAB process comprising a plurality of cycles with each cycle comprising exposing the substrate to gaseous trimethyl aluminum, stopping the flow of gaseous trimethyl aluminum which is consistently removed from the chamber by a vacuum pump, exposing the substrate to an oxygen source which is consistently removed from the chamber by a vacuum pump and forming an aluminum oxide film of approximately 0.22 mL per AB cycle (p241, column 1). Dillon et al. does not teach using oxygen plasma as the oxygen source rather than water vapor but it is clear from the document that a layer free of contaminants is of importance to the study disclosed. Penneck et al. teaches using trimethyl aluminum as a precursor in column 14 lines 9-35 and then using an

oxygen plasma, or atomic oxygen, to form a coating of the aluminum oxide (column 11 lines 1-18) in order to form a layer free of contaminants that would normally occur during wet deposition processes (columns 7 and 8 lines 59-21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Dillon et al. to include using an oxygen plasma as an oxygen source alternating with the aluminum source as taught by Penneck et al. in order to form a layer free of contaminants that would normally occur during wet deposition processes.

Regarding claim 2, Dillon et al. discloses that the thickness of an aluminum oxide layer after each cycle depends upon the amount of amorphous aluminum oxide present and the reaction mechanism (see pages 239-241 et seq.) Therefore, the variable of aluminum oxide layer thickness is modified by routine experimentation and is not inventive.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Dillon et al. to include a layer thickness of aluminum oxide as 3 A by routine experimentation depending upon the application of the layer absent evidence showing a criticality for the claimed value.

Regarding claims 3 and 19, Penneck et al. discloses that the plasma may be generated and used in a commercially available plasma oxidation unit in column 11 lines 1-7. A remote plasma generator would have been available to Penneck et al., or

at least to those at the time of the invention. See, for example, US patents 4882008, 4949671, etc.

Regarding claims 4 and 20 that require room temperature, Dillon et al. cites a temperature of 300 K (p 232), which may be considered room temperature at least as broadly as it is described in the claims. Dillon et al. also modify this variable throughout the document to achieve different results due to reaction thermodynamics and reaction kinetics. Therefore, it also would have been obvious to one of ordinary skill in the art at the time of the invention to modify Dillon et al. to include a reaction temperature at room temperature absent evidence showing a criticality for room temperature.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly Stouffer whose telephone number is (571) 272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kelly Stouffer
Examiner
Art Unit 1792

kms

TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER